STATEMENT OF WILLIAM T. COLEMAN, JR., SECRETARY OF TRANSPORTATION, BEFORE THE SUBCOMMITTEE ON AVIATION AND TRANSPORTATION RESEARCH AND DEVELOPMENT OF THE HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY ON THE FUTURE OF AVIATION, TUESDAY, MAY 4, 1976.

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to appear before this Subcommittee as you begin your hearings on "The Future of Aviation." Accompanying me today are the FAA Administrator, Dr. John McLucas, and the Assistant Secretary for Systems Development and Technology, Hamilton Herman.

I've noticed that when people want to call attention to something -- their industry, or agency, or whatever -- they often tend to talk about "critical" periods. That phrase has been used a great deal recently in connection with the aviation industry..."We are facing a 'critical' period in aviation."

Now to me, "critical" has the connotation of a "crisis," a real danger period. So I try not to use it, unless that's what I really mean. And I don't believe that we face a crisis in aviation. Far from it. But this is an "important" time for aviation. For the mid-70's is a transition period for the industry--both the air carriers and the aerospace manufacturers. It is a time of transition--I believe--to a new and productive period.

- The carrier industry is moving out of its high-growth stage into a more mature stage--at least for the scheduled segment.
- It is moving away from operating with heavy government regulation toward operation under market forces.
- The manufacturing industry has been moving away from reliance on the government market toward the commercial market.
- As a Nation, we are moving into a period of more deliberate growth, as we attempt to mitigate the adverse effects of economic peaks and valleys, and a high rate of inflation.
- The world is moving toward the realization that we have finite resources that must be planned for, conserved, and rationalized.

With this transition period as our perspective, I'd like to set out for you here where the aviation industry stands now, and where I believe it is going. I have some answers to that second point, but I will tell you at the outset that I do not have them all. Along with you, Mr. Chairman, I will be listening very carefully to what the people who follow me here have to say. They will, I hope, be offering more answers--or at least the insights that will lead to them.

Now let me give you a brief picture of the aviation industry in 1976.

There is no doubt in my mind that despite its problems, the United States has, by far, the finest air transportation system in the world--whether it is measured by safety, by convenience, or by service to the public. Our system combines high levels of safety, convenience, and service--at fare levels that are low compared to the rates prevailing in other areas of the world.

Since the infancy of the air carrier industry in the 1930's, roughly 58,000 city pairs have become accessible to travelers and shippers on the U.S. domestic route network. We have watched the industry progress through a series of steps to serve its growing markets. At one stage we had the venerable DC-3, with ~~40~~ 21 seats and ~~120~~ 160-mph speeds -- shorthopping to connect a select few markets. Now we see sleek, wide-bodied airplanes, incredibly complex but reliable, carrying 10 times the people, 4 times faster, and 10 times farther. They carry their passengers safely above the weather, and routinely in and out of airports, under what old timers would have considered impossible conditions.

Behind the scenes, an impressive array of technology has been applied to make all this possible. Today in the United States, our 12,700 airports are used by over 2,500 air carrier aircraft, and

160,000 smaller, general aviation aircraft. In all, there are 13,000 air carrier flights each day.

That's the operational side of the air carrier industry today. I plan to discuss the financial picture later. For now, let me give you our summary projections for the future, which looks considerably brighter than the recent past.

1975 was one of the worst years in airline history financially. But I see the industry making a strong economic comeback in 1976. We expect an 8 to 10% increase in traffic for the year. By year-end, we expect that domestic trunk carriers will have returned to profitability, with an aggregate net income in the range of $200 to $300 million.

Beyond 1976, we look for a substantial period of economic growth, which should re-establish a trend of both traffic gains and profitability. In particular, I see great potential for U.S. carriers to expand their charter business, the market for low-cost vacation travel in the U.S. being essentially unfathomed. Looking even further ahead, we project that between now and the year 2000, scheduled air carrier enplanements will increase about 5% annually, airport operations about 5.5%, and general aviation operations over 6%.

The U.S. air carrier industry has an $18 billion capital investment, generating $11 billion in revenues, and providing 300,000 jobs. If we add the U.S. aerospace industry, we could include another $14 billion in investment, $30 billion in revenue for 1975, and over 400,000 jobs.

The U.S. commercial airframe industry has been pre-eminent in the world market place up to now. Eighty-five percent of the aircraft flying today are of U.S. manufacture. In 1975, we exported nearly $8 billion in products. By contrast, our nearest competitors (France and Great Britain) exported $2 billion and $1.6 billion respectively.

But there is a downside to the picture as well. European and other governments are very interested in the lucrative world market. And their industries have begun to make their presence felt. The Franco-German A300B demonstrates this clearly. The U.S. industry can and will maintain its pre-eminence. But it will require all our efforts to do so.

The growth enjoyed by the aviation industry has been made possible in large part by technological innovations that have enabled the industry to meet changing demands and to keep fares relatively low. The list is a long and impressive one; next week Dr. McLucas will describe some of these innovations and their impact on aviation. I'll mention just a few here.

Modern concepts of air traffic control have allowed our modern aircraft to crisscross our Nation's skies with a remarkable safety record. More recently, improved landing aids at airports have brought all-weather operations closer to reality. I expect that we will see other contributions of technology -- inside and outside the aircraft itself--that will continue to spark the growth of the aviation industry. Improvements in cockpit displays, information processing, weather information, and area navigation systems will enhance the efficiency and safety of air operations.

A specific example of new technology designed to meet a practical goal--in this case, saving time and fuel--is a service that uses predictive models to provide a computerized flight plan geared not only to a particular aircraft's performance characteristics, but also to the projected weather enroute. A specially tailored flight plan of this type provides optimum heading and power settings for the entire flight.

We are also seeing the introduction of specialized aircraft to meet particular demands. The market needed a dedicated all cargo aircraft, and the B-747-F came about. An extra long-range, wide-body was needed, and the B-747-SP is now in commercial operation. Timely investments in research and development by the

government and industry, working together, have made these accomplishments possible. I expect, and will work, to see that this cooperative partnership continues.

As you are aware, three Federal agencies are directly involved in aeronautical R&D--DOD, NASA, and DOT. The DOD effort is channeled towards R&D necessary for the national security--nearly $3 billion is being spent now on aeronautical-related R&D. NASA has allocated about $300 million for aircraft research. It concentrates mainly on developing fundamental engineering concepts basic to design improvements. The DOT portion of the Federal aviation R&D budget is about $100 million. The Assistant Secretary for Systems Development and Technology oversees our R&D activities, with particular emphasis on intermodal applicability, and serves as the focal point for coordination. The FAA has program responsibility for most of our efforts. The benefits have been substantial. Additional innovations can be expected in the future and Dr. McLucas will expand on this next week.

Though DOD, NASA and DOT are three separate agencies, we have found a way to work together, through both formal and informal information-sharing mechanisms. There are four formal groups involved:

1. The NASA-FAA Coordinating Committee, which is designed to prevent duplication of effort.
2. The Aeronautics and Astronautics Coordination Board, which is designed to coordinate activities between NASA and DOD with DOT as an observor.
3. The Advisory Group for Aerospace Research and Development of NATO. This group coordinates the civil and military R&D interests of NATO members.
4. The NASA Research and Technology Advisory Council. This group includes industry and academic participants.

In addition, there are ad hoc groups that meet regularly to exchange information and ideas. In fact, there are full-time DOD and NASA groups physically located within the FAA building to facilitate information exchange. We don't keep this information to ourselves either. There is an active program to disseminate to the industry the results of R&D efforts having commercial applicability.

The forecast I gave you for the air carrier industry a moment ago was a conservative one. I could easily paint a more optimistic picture. At the same time, I must be frank in saying that there are problems to overcome before even conservative goals can be realized. I'll start with the economic problems, because they are the most serious, and because they have an impact on the others.

The economic problems of the commercial air carrier industry can be summed up in one phrase--its low profitability for the past eight years. Some years have been better than others. Some carriers have done better than others. But the industry return on investment has averaged only 5.7%, far too low to attract the private capital needed for the future.

I believe the underlying cause of the problem has been the expensive and, on the whole, repressive impact of outmoded government economic regulation. This has tended to keep prices to the public up, and to put inflationary pressures on costs. But it has also kept industry profits down. Other factors have also contributed to the problem -- some of them related to regulation, others not. Let me list the major ones here, keeping in mind that I am vastly over-simplifying my discussion in the interest of time.

First, is the cyclical impact of national economic forces on the air carrier industry, which has a high degree of correlation with fluctuations in GNP -- with prosperity and recession periods. As a result, net income has been erratic, though it has generally trended down since 1967.

Second, is the long-term slowing in the industry's own rate of growth. The technology-spurred 15% growth rates of the sixties

slowed to an average of less than 4% in the seventies. While we expect to see the growth rate increase again, the scheduled industry has moved into a stage of slower, but I believe more stable, development.

Third, is the impact of steadily increasing costs. Not only in the recent high-inflation period (which President Ford's program is now correcting) but long-term cost increases. Expenses overall have increased faster than revenues for the industry since the late sixties. And its two largest cost categories--labor and fuel--have had the greatest increases.

Fourth, there is the presence of excess capacity in the system. Some of the excess is due to the economic downturns of 1970 and 1975. But industry management must shoulder some of the responsibility too. In the late 1950's the industry assumed an annual growth rate of 15%, and purchased aircraft based upon this assumption, which turned out to be wrong. Under the present regulatory system, it had no way of using the resultant excess capacity in an intelligent manner.

Fifth, excess capacity has contributed to low load factors which now are only in the 50% to 55% range.

Sixth, there has been a decline in average yields for the industry. This is due in part to the fact that demand for low-cost, mass travel has grown faster than demand for the traditional scheduled services.

Because of regulatory restrictions, the industry has not had the flexibility to respond efficiently to this shift in demand. In their attempts to do so, the airlines have diluted their average yields. We must of course be aware that scheduled services are, and will remain, the backbone of the air carrier industry. At the same time, we are also anxious to see that the low cost, mass or charter market is served responsively and profitably.

Taken together, these factors have eroded the industry's profitability. Since 1967, profit margins have averaged only 2.5%. ROI has ranged from a high of 8.5% to a low of 2.1%. But as I noted above, it has averaged only 5.7%, which compares very unfavorably with the ROI of other industries.

As profits have declined over the years, the industry has had to turn more and more to debt financing of its heavy capital expenditures. Debt-equity ratios for most carriers now stand well above the 50% level. As a result, the banks and insurance companies, who are the traditional lenders to the industry, have all but turned off the supply of funds. As I said earlier, these observations do not hold true for all the carriers. Some, in fact, continue to be profitable. But, the industry as a whole is looked on as a poor risk. Insurance companies have publicly

stated that they will not make further loans to the airline industry until its financial situation is significantly improved.

There is one facet of this problem that I find particularly troubling. For a variety of reasons, the airlines turned to leasing rather than purchase of their capital equipment in the sixties. In my view, this has had two serious consequences.

One, leasing--particularly leverage leasing, whereby a marginal airline can sell its depreciation and investment tax credits--has made it too easy for marginal airlines to obtain aircraft. This has contributed to the excess capacity problem, since traditional financing methods would not have supported the capacity acquisitions made under leases.

Second, leasing keeps off the balance sheet, and out of open view, what is often as binding an obligation as debt. At the end of 1974, reported industry debt, as a percent of total capitalization, was around 57%. If the present value of minimum lease commitments were to be included as debt ($4.4 billion) the ratio would rise to around 70%. Thus, as bad as it looks now, the industry's debt position is actually understated.

Putting all of these causes and effects together, we come down to this: the air carrier industry is suffering more seriously than most from the capital formation problem that confronts all U.S. industry. The airlines are finding it difficult in the extreme to obtain the funds they need to reequip--to replace their aging fleets. This of course has serious consequences, in turn, for the aerospace manufacturers.

To follow an orderly process of replacement, and to purchase for growth, it is estimated--conservatively, I might add--that U.S. airlines would have to spend on the order of $3 billion to $4 billion a year. This amounts to roughly $25 billion to $30 billion between now and 1985, and about $100 billion by the year 2000. But, as you know, for the past five years, the airlines have not been following an orderly replacement pattern. For one thing, they have excess capacity. For another, because of their poor earnings, they have been keeping their old planes longer--taking 18 to 20 years to retire them instead of the traditional 12 to 14. Flying older airplanes may be good airline economics. But only up to a point--especially when you take into account their inefficiencies in terms of energy conservation, productivity gains, and environmental concerns. And it certainly makes problems for the manufacturing industries.

New airplane orders are directly tied to airline net earnings. As the airlines' economic health has declined, so have unit sales of the manufacturing industry. As I mentioned, the foreign market has taken the lion's share of U.S. civil aircraft production in recent years. It currently represents roughly 80% of our production. However, this fact has not been lost on the European aircraft industry. European manufacturers have been rejuvenated with government subsidies, and have begun to erode the U.S. share of the world market.

I am confident that resolution of the airlines' profitability and capital formation problems will be the remedy for many of the manufacturers' problems as well. But not all. As I said earlier, it has been the great technological advances that have produced most airline productivity gains in the past. I expect that we will continue to achieve technological advances. However, because of the complexity of the system, and limitations in resources, these advances will not be so readily translatable into net productivity gains. This is true for private, civil, and military programs.

Then there are other difficulties. Our goals in past development were relatively compatible. Increases in speed, size, and performance could be pursued in tandem. Now, however, we

must balance these goals against others, which are not compatible and may even be conflicting. For example: more efficient use of our limited resources, reduction of air pollution and noise impacts on our communities, and the need to reduce per-seat and per-mile costs.

As we apply our technology to these problems, we must keep in mind what it is, in the final analysis, that we really want to achieve.

There are many criteria for measuring a successful aircraft. But the fundamental measures, in my view, are: "How long does it take to get from Point A to Point B?" And, "How much fuel and other resources are expended in getting it there?" It's not just the speed of the plane that determines the total time from Point A to Point B. If the plane doesn't have to stop to refuel, it cuts the time of the trip. Improved technology can also speed up the journey, - for example, better air traffic control and better navigational and landing systems. In the long run, incremental improvements in derivative aircraft can add up to changes and benefits as dramatic as those obtained from entirely new planes.

As I indicated at the start we do not have all the answers to the problems I've discussed. But there are remedies. More

importantly, perhaps, we have a new direction, a new approach.

You know the long-term solution I have recommended for the economic troubles of the air carrier industry--reform of the manner in which it is regulated economically. As we have designed it, our proposed Aviation Act will permit efficient airline management to remedy many of the problems I identified earlier. It does this, essentially, by allowing carrier management freedom to make decisions that are responsive to the market place rather than to a Federal regulatory regime. But it also encourages changes in the system itself.

I have already testified at length elsewhere on the details of the Aviation Act. Here, let me just describe briefly the changes to the industry and the system that I see resulting from the Act. While it may take the long term to realize all of these benefits, many of them will become available as soon as the Act is passed, and therefore provide relief in the short term as well.

First, we will have price competition and, I believe, a consequent reduction in many fares, particularly fares in dense markets and recreational markets. But there will also be higher total gross revenues.

Second, as prices decrease, demand will increase -- particularly in the more elastic markets. As demand increases, of course, we will see higher load factors, much less excess capacity, and the leverage of those factors on profitability. Well-managed airlines will be able to achieve the earnings they deserve.

Third, we will see greater system rationalization, as carriers have more freedom to enter and exit from routes. This will build a more efficient route structure from the standpoint of both service and economics.

As a corollary to this, we will see improvements in efficiency and productivity, as carriers tend to specialize by market and then tailor their fleets and equipment purchases to those markets. Carriers who prove they can function best in dense or long-haul markets will match their fleets to these markets. Carriers who choose to serve smaller or less dense markets will gradually develop a different type of fleet. What we can look for is the gradual disappearance of the inefficiency inherent in large aircraft serving 10-or 20-passenger markets at 20% or 30% load factors.

On this point I want to mention that our recent amendment to the Aviation Act is a first step to improve service to small communities. We are also working with NASA and DOD in looking

at approaches that might make the market more attractive to the aerospace industry by stimulating some commonality of operational capability between military and civil utility transports.

Fourth, both business and pleasure travelers will have a greater range of price/service options to choose from. This will not only benefit the public but also increase demand.

Am I being too optimistic in my projections? I don't believe so. Right now, more than 40% of our population has never taken even one air trip. I think this is wrong - I'd like to see the day when everyone who wanted to, could plan a vacation trip by air. If the industry becomes more cost-efficient and market-responsive, as it should, then a greater portion of our population can and will be able to enjoy air travel -- assuming a continuing rise in the level of the economy.

We also must look to the aerospace manufacturers for the progress that will make this possible. So let me now describe the solutions we can expect from them. My staff and I spend a good deal of time exchanging information and ideas with industry representatives. I can say with some confidence, therefore, that much of the technology for the next generation of commercial aircraft is available today.

- Engines with 20% better fuel economy, cleaner burning, with noise levels 10 EPNdB below current noise standards, and sized for the market's needs.
- Advances in airframe and airfoil design to reduce drag and provide more efficient flight.
- Advances in electronic controls, both to optimize the operation of the airplane's systems and to improve navigation and safety.
- Computer aided advances in fabrication methods and materials for less weight, greater strength, and durability.

Jet engine manufacturers are also confident of the longer term prospects for the air transport industry. General Electric and Pratt and Whitney, with their foreign partners, have committed many millions of dollars toward the development of a new high by-pass engine, the so-called "Ten-Ton" engine. These engines, they have told us, will be available, in commercial quantities in the very early 1980's.

So, the engines, which are the longest lead-time items, will be available. The airframe manufacturers have also devoted many millions in R&D to planning the new models. One essential ingredient is lacking, however--firm airline orders in adequate numbers to justify commitment to new production. A new model commercial airplane will require an investment of $1 billion plus, for design, testing, and production tooling. Even a derivative model - that is, one derived largely from a model already in production - would require an investment on the order of $600 million.

We are all aware of the replacement needs for today's commercial airplane fleet. Of the roughly 2,150 turbojet aircraft in the U.S. air carrier fleet today, only about 300 are the newer, quieter, wide-body models (the 747s, DC-10s, and L-1011s) About 1,300 are the older, noisier, short- and medium-range models (the 737s, DC-9s, and 727s). The remaining 550 are the oldest, noisiest, medium- and long-range models (the 707s and DC-8s). These are the airplanes that should be dealt with first -- because of both their age and their adverse environmental impact.

You are aware that adverse environmental impact has led to the development of proposals for the retrofit of these older airplanes. I have been criticized by some for delaying the decision on which, if any, of the proposals I have under review is acceptable. I am concerned about the noise problem. However,

I would not be acting responsibly if I required a large investment in each aging aircraft without considering potentially more productive approaches. This is particularly the case when it is possible to achieve significantly greater noise reductions with new aircraft than with retrofitted planes, and at the same time deal with the problem of an aging aviation fleet.

Of course, we are also looking at other less costly alternatives including the replacement of engines only, the establishment of preferential runways, and the adoption of new landing and takeoff procedures.

I wanted to devote more time to evaluating all reasonable alternatives. The matter is under active review, and I hope to have a position to recommend to the President soon. Of course, if there are budget implications, additional time may be necessary to evaluate their impact within the Administration and to reach a consensus regarding a proposal.

The question of whether we retrofit or replace the noisy older aircraft is only one part of the larger question we are dealing with here -- how will the next generation of new aircraft be funded, and how will longer range aviation R&D be funded?

In answering this question, we need to consider very carefully the proper relationship between the Federal Government and the private sector. I believe the basic role of the Government is to create the proper climate for healthy private operations. And I believe we have gone to the root of the problem by proposing the regulatory reforms contained in our Aviation Act. I do not believe that the Government should finance the development of commercial aircraft. On the other hand, the Department of Transportation may properly take a role in long-range R&D.

The FAA has underway evaluations to determine particular long-range R&D projects that merit greater Federal investment. The criteria they will be using are those identified in my Statement of National Transportation Policy:

- Would the public interest and Federal priorities be served more effectively by alternative uses of the Federal dollar?

- Could the need be met as effectively by the private sector or by another level of government?
- Are there alternative sources of financing?

It is said, those of who do not learn from the lessons of history are doomed to repeat them. As Secretary of Transportation, I am perhaps more mindful than most of the lessons to be learned from the railroad industry. I am also mindful of the disturbing parallels between the railroads and the airlines to date--declining earnings, heavy debt, aging equipment. But as I have said, I believe the future promises a reversal of these trends through the approach I have outlined here. We must start with the re-establishment of reasonable airline earnings in a stable and productive financial environment. We must build on it with a flexible and responsive regulatory system. We must proceed with a sound, coordinated R&D plan of action to protect the longer-range future.

Thank you Mr. Chairman. My associates and I will be pleased to answer any questions you or the Members of the Subcommittee may have.